

September 17, 1949

# The American FERTILIZER




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1850—1949



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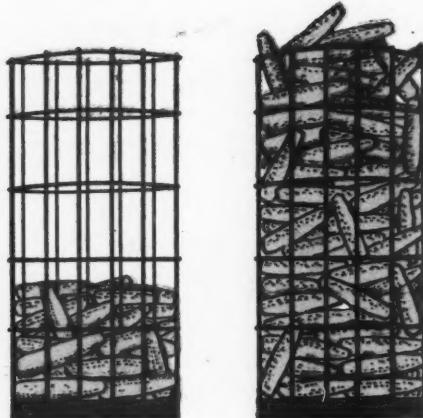
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We manufacture all grades of Commercial Fertilizers, Superphosphate, Agronite Tankage, Bone Black, Bone Black Pigments (Cosmic Black), Bone Ash, Bone Oil, Dicalcium Phosphate, Monocalcium Phosphate, Gelatin, Agricultural Insecticides (including Pyrox, Arsenate of Lead, Calcium Arsenite, etc.), Trisodium and Disodium Phosphate, Phosphorus, Phosphoric Acid, Sulphuric Acid, Ammonium Carbonate, Ammonium Fluosilicate, Magnesium Fluosilicate, Potassium Fluosilicate, Phosphorus Pentasulphide, Phosphorus Sesquisulphide (lump), Zinc Fluosilicate, Salt Cake; and we are importers and/or dealers in Nitrate of Soda, Cyanamid, Potash Salts, Sulphate of Ammonia, Raw Bone Meal, Steamed Bone Meal, Sheep and Goat Manure, Fish and Blood. We mine and sell all grades of Florida Pebble Phosphate Rock.



## FACTORIES

|                   |                       |                       |
|-------------------|-----------------------|-----------------------|
| Alexandria, Va.   | Cleveland, Ohio       | No. Weymouth, Mass.   |
| Baltimore, Md.    | Detroit, Mich.        | Pensacola, Fla.       |
| Buffalo, N. Y.    | Fulton, Ill.          | Pierce, Fla.          |
| Carteret, N. J.   | Greensboro, N. C.     | Port Hope, Ont., Can. |
| Cayce, S. C.      | Havana, Cuba          | Savannah, Ga.         |
| Chambley Canton,  | Henderson, N. C.      | Searsport, Maine      |
| Quebec, Can.      | Montgomery, Ala.      | South Amboy, N. J.    |
| Charleston, S. C. | Nat. Stockyards, Ill. | Spartanburg, S. C.    |
| Cincinnati, Ohio  | Norfolk, Va.          |                       |

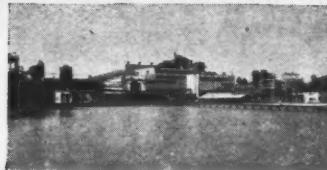
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50 Church Street, New York 7, N. Y.

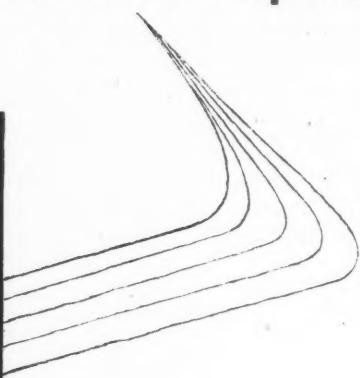
## SALES OFFICES

|                   |                   |                           |                       |
|-------------------|-------------------|---------------------------|-----------------------|
| Alexandria, Va.   | Clinton, Iowa     | Laurel, Miss.             | Pensacola, Fla.       |
| Baltimore, Md.    | Columbia, S. C.   | Montgomery, Ala.          | Pierce, Fla.          |
| Buffalo, N. Y.    | Detroit, Mich.    | Montreal, Quebec, Can.    | Port Hope, Ont., Can. |
| Carteret, N. J.   | Greensboro, N. C. | National Stockyards, Ill. | Savannah, Ga.         |
| Charleston, S. C. | Havana, Cuba      | New York, N. Y.           | Spartanburg, S. C.    |
| Cincinnati, Ohio  | Henderson, N. C.  | Norfolk, Va.              | Wilmington, N. C.     |
| Cleveland, Ohio   | Houlton, Me.      | No. Weymouth, Mass.       |                       |





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# The American FERTILIZER

Vol. 111

SEPTEMBER 17, 1949

No. 6

## Sulphur in Agriculture

Abstracts of papers to be presented at the Sulphur Symposium of the Division of Fertilizer Chemistry, American Chemical Society, Atlantic City N. J., September 20, 1949

### Sulphur and Life

*W. W. Duecker, Texas Gulf Sulphur Company, Inc., New York,  
New York*

The role of sulphur in soil fertility and in the nutrition of plants and animals is briefly indicated. In the soil, sulphur, usually in the form of organic matter and sulphates, improves soil structure, increases its water-holding capacity, modifies soil reaction, and stimulates growth of soil microorganisms. Plants assimilate the sulfate ion and change it into complex organic compounds. Humans and animals are entirely dependent for their sulphur supplies on these complex organic sulphur-containing compounds manufactured by plants. These compounds include certain vitamins, protein, etc., essential for the well-being of every living cell and for the normal growth of all species of animals, of yeasts and molds, and of higher plants. For a long time the sulphur content of soil and its relationship to plant and animal nutrition were not appreciated. Then the development of better chemical analytical methods focused attention on the fact that sulphur supplies in the soil may be depleted and stimulated an appreciation of the value of sulphur as an ingredient of fertilizers. New research techniques involving the use of radioactive sulphur and tracer materials are now being applied to the study of sulphur in plant and animal nutrition. It is anticipated that these studies will lead to a better appreciation of the role of sulphur in agriculture.

### Relations of Microorganisms to Transformations of Sulphur in Soils

*R. L. Starkey, Rutgers University, New Brunswick, N. J.*

Transformations of sulphur involve various reactions by diverse microorganisms. Much of the sulphur in soils is in organic compounds from which the sulphur is released by microbial attack. Persistence of sulphur in soils of humid regions is due principally to presence of organic compounds of sulphur. Whereas sulfide is the principal inorganic product of decomposition of organic compounds under anaerobic conditions, there are various other products such as elemental sulphur, sulfate, thiosulfate, and polythionates under aerobic conditions. Various primary products are formed by different microorganisms, and the products vary depending on the composition of sulphur compounds that are attacked. With a single compound such as cystine, one organism produces sulphide whereas others produce sulfate or elemental sulphur or several different inorganic compounds.

Sulphide, thiosulfate, polythionates, elemental sulphur, and even thiocyanate are oxidized by microorganisms. Whereas decomposition of organic sulphur compounds is effected by various heterotrophic bacteria, filamentous fungi, and actinomycetes, inorganic sulphur compounds or elemental sulphur undergo oxidation by both heterotrophic organisms and autotrophic bacteria. Some bacteria tolerate high acidity. Sulphate is the end product of

oxidation under aerobic conditions; various microorganisms may participate in the reactions before sulphate is formed.

Under reducing conditions inorganic sulphur compounds and elemental sulphur are reduced by various heterotrophic bacteria with formation of sulphide. Sulphate is reduced to sulphide, but by only a specific group of bacteria. This leads to the production of iron sulphide and iron pyrites.

The soil reaction may become exceedingly acid following treatment with elemental sulphur. Soils recovered from the sea and that, while submerged, had accumulated iron sulphides also tend to become acid by oxidation of the sulphide. Under anaerobic conditions sulfate-reducing bacteria cause corrosion destructive to steel and cast iron.

### Sulphur Metabolism in Alfalfa

*Moyer D. Thomas, Russell H. Hendricks and George R. Hill,  
American Smelting and Refining Company, Salt Lake City, Utah*

The leaves of alfalfa contain at least 2.5 times as much sulphur as the stems. Normal well-nourished alfalfa leaves have 0.25 to 0.30 per cent organic sulphur. Significantly larger amounts have not been found. Additional sulphur up to 2 per cent may be present as sulfate. Less than 0.15 to 0.20 per cent organic sulphur indicates a deficiency that manifests itself in chlorosis and decreased rate of growth. Little sulphate is present in this case.

From studies using radiotracers, paper chromatography, and chemical methods it is shown that cystine and methionine are important sulphur compounds in the alfalfa leaf proteins. Their amount is markedly reduced if the supply of sulphur to the plant is limited. Excess sulphur appears as sulphate.

Sulphate uptake through the roots and translocation to all parts of the plant are rapid. On the other hand sulphur added to alfalfa leaves as sulphur dioxide in sublethal amounts is rapidly oxidized to sulphate which appears to be fixed. Translocation from the leaf is very slow, at least until the leaf ages. The roots remain low in sulphur, and may even exude sulphate in the dormant period.

### Sulphur Status of Indiana Soils

*B. R. Bertramson, Maurice Fried, and Samuel L. Tisdale*

This paper summarizes the sulphur studies conducted at the Agronomy Department of Purdue University during the past three years.

The amount of sulphur which is brought down annually in the precipitation ranged from 24 to 150 pounds per acre for the state of Indiana. The average for the state is approximately 40 pounds per acre per year.

A report of the sulphur reserves of Indiana soils is made.

The direct absorption of sulphur by plants and its elaboration into organic constituents of the plant was conclusively demonstrated by use of isotopic tracer technique.

The general sulphur balance under Indiana conditions has been appraised. It seems that, under average crop production conditions, the likelihood of a sulphur deficiency is not great at present.

While field tests failed to show a response to sulphur fertilization, intensive cropping with alfalfa in the greenhouse did bring about sulphur deficiency symptoms on several soils.

The use of sulphur as a soil amendment gave special promise of usefulness in the manganese-deficient areas of northern Indiana.

Studies demonstrated the dependence of geneticists and soil fertility specialists upon each other in order to avoid erroneous conclusions in some phases of their work. Alfalfa plants with different genetic characteristics for methionine and cystine elaboration were found to behave differently when grown under different levels of sulphur fertility.

### The Effect of Soil Acidification on Some Chemical Properties of a Soil and Plants Grown Thereon

*P. C. Aldrich and F. A. Gunther*

Laboratory and greenhouse studies have been conducted with an alkaline, noncalcareous soil acidified to different pH levels with sulphuric acid to determine the influence of a change in soil reaction on plant growth and composition.

The acidified soil was cropped twice, first to alfalfa and then to sweet orange seedlings. Weight data obtained on the harvested plant material indicate that increasing degrees of acidification result in decreased growth of alfalfa but increased growth of sweet orange seedlings.

Chemical analyses made on the acidified soil before the alfalfa was planted show that the amounts of water-soluble Ca, Mg, Na, K, Mn, P, and SO<sub>4</sub> present in the soil are increased by acidification and that the amounts of exchangeable Ca, Mg, Na, and K are decreased.

Chemical analyses made on the plant ma-

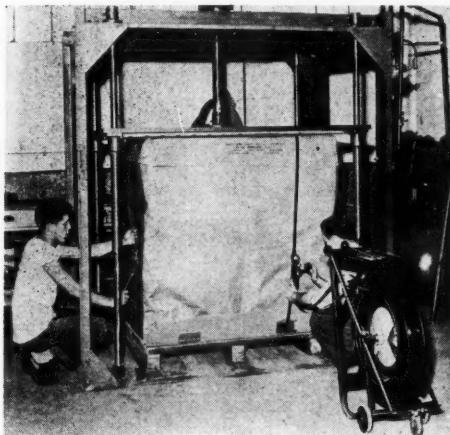
(Continued on page 26)

## St. Regis Introduces Unit Load for Shipping Bags

Less costly and safer handling of large numbers of empty kraft paper bags during transit from bag plants to customer's warehouses has been developed in the new St. Regis Unit Load.

The Unit Load, designed by the Multiwall Bag Division of St. Regis Paper Company, offers many advantages over customary palletized loads in the shipment of large multiwall paper bags and also sugar pockets and similar kinds of consumer type containers. In addition to its own Unit Load, St. Regis also ships palletized loaded bags for customers desiring the latter method.

The Unit Load is the systematic arrangement of 1,000 to 2,000 multiwall bags (depending on size and construction) into one unit.



**St. Regis unit load being banded under pressure. Expendable paperboard slots are built into each unit to accommodate lift truck forks.**

Built into the Unit at the bottom are two parallel, expendable paperboard slots (either rectangular or circular) into which the forks of any standard lift truck are inserted for easy movement of the Unit. Distance between the slots is variable. The Unit is subjected to pressure to compress the bags into a solid, flat and compact bundle, and then is wrapped in protective kraft paper and steel banded.

Multiwall customers report the Unit Load offers a considerable saving in time and labor costs in emptying carloads of bags; greater ease in storing bags prior to delivery to automatic packers that ultimately fill the bags with industrial or agricultural products; less

damage to bags in transit due to added protection afforded by the heavy wrapping paper; quicker inventory of bag stocks on hand, and overall better appearance of stacked bags in warehouses.

The St. Regis Unit Load has advantages over a pallet load in that the danger of pallets collapsing, distorting the bundle, is eliminated; in stacking, especially where space is limited, there is no loss of space between bundles; the expendable fork slots are more easily disposed of than pallets, and because of its firm, compact shape, the Unit Load can be handled two at a time by one fork truck operator.

One company reported that where six men formerly worked eight hours at a cost of \$74.40 to empty a carload of bags bundled in



**St. Regis unit load design makes for more efficient handling and stacking.**

lots of 100, one fork truck operator unloaded a car of unitized multiwalls in less than four hours at a labor cost of \$6.20. Two other concerns reported unloading times of as low as one and one-quarter hours for unloading that formerly required up to 26 man-hours.

Steps to reduce handling costs and damage-in-transit also have been taken by St. Regis' Carloading and Materials Handling section of the Field Promotion department. Organized in the past two years, this section has effected

(Continued on page 24)

## THE AMERICAN FERTILIZER

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PIONEER JOURNAL OF THE FERTILIZER INDUSTRY

A. A. WARE, Editor  
 K. F. WARE, Advertising Manager

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No. 7

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### September Crop Report Shows Little Change

The excellent 1949 all-crop prospects were maintained during August, even though weather conditions were less favorable than usual in some important crop areas, according to the September report of the U.S.D.A. Crop Reporting Board. A slight decline of 13 million bushels in corn prospects resulted from deterioration due to hot, dry weather in the northwestern part of the Corn Belt, which was not entirely offset by improvement elsewhere. Changes in most other crops—some up, some down—were relatively small, as declines in areas of adverse conditions were more or less offset by improvement in favored areas. The weather was mostly favorable for harvesting grains and hay, reducing harvesting losses to a minimum. Plowing and preparation of fields for fall-sown crops was well advanced and some seeding had been done throughout the Great Plains in good seedbeds.

Corn prospects declined to an estimated production of 3,526 million bushels, only 3.5 per cent less than the record 1948 crop. Spring wheat production at 234 million bushels is only slightly below the August 1 forecast, with harvest nearly complete. Adding the earlier estimate of winter wheat, all wheat production totals 1,129 million bushels. Other crops nearly all harvested show slight changes since August 1, with more hay, with oats and barley threshing out better than expected in some areas, but flaxseed a smaller outturn. Improvement, also to a minor extent, was noted in estimates of such later-growing crops as cotton, soybeans, rice, sorghum grain, buckwheat, potatoes, peanuts, sugarbeets, hops, broomcorn, and most deciduous fruits. Small declines were shown in estimates of dry beans, sweet potatoes and tobacco. The tropical storm late in August reduced prospects for sugarcane and citrus in Florida.

The total outturn of all crops, based on current estimates, is virtually the same as forecast on August 1. The current total is 130 per cent of the 1923-32 base, second only to the 137 per cent in 1948. Only rice and tree nuts promise record production in 1949, but corn, soybeans and grapes are second-largest in history. Among relatively large crops are cotton, wheat, flaxseed, sorghum grain, dry beans, cherries, and sugarcane. Crops exceeding average by a narrower margin include oats, tobacco, apples, peaches, pears, hops, cranberries and broomcorn. Below average are hay, barley, peanuts, potatoes, sweet potatoes, sugarbeets and apricots, with rye, buckwheat and dry peas very small crops.

## Howell Elected President of Virginia-Carolina Chemical Corporation

Joseph A. Howell, executive vice-president of Virginia-Carolina Chemical Corporation since 1944, was elected president of the 54-year-old concern at a special meeting of the Corporation's Board of Directors in Washington, D. C., on September 16th. He succeeds the late A. Lynn Ivey who died suddenly August 18th.

A native of Alabama, he began his career with V-C as a salesman in the Mobile, Ala., office in 1922. After serving as assistant sales manager in both the Shreveport, La., and Jackson, Miss., offices, he became manager of the Jackson office in 1932.

Mr. Howell moved to the home office of the Corporation at Richmond in 1936 as Southern sales manager and a year later was named general sales manager. He was elected vice-president in charge of sales in 1938, a position he held until 1944 when he was elected executive vice-president and director.

The newly-elected V-C president has served since 1946 as president of Tobacco By-Products and Chemical Corporation, a wholly owned subsidiary of the concern. He is a director of the Bank of Virginia and a member of the Executive Committee of the Richmond (Va.) Chamber of Commerce.

Mr. Howell is a member of the Board of Directors of the American Plant Food Council and was elected chairman of the organization's Executive Committee in June.

## New Book on Irrigated Soils By Blakiston Company

The Blakiston Company, of Philadelphia, has recently published a new book entitled *Irrigated Soils: Their Fertility and Management* by D. W. Thorne and H. B. Peterson, of Utah State Agricultural College. This book presents irrigation procedures in every part of the world and covers the evaluation of land for irrigation, drainage, reclamation, and control of biological properties of the soil.

About one-fourth of the text is devoted to soil fertility, the use of manures, the various commercial plant foods, fertilizer placement, fertilizer ratios, etc. It is intended as a text book for students with only elemental knowledge of the agricultural sciences and contains much of interest and value for the fertilizer research man.

The volume contains 288 pages, with 74 illustrations and is priced at \$5.00 per copy.

## N. F. A. Fall Meeting

The annual fall meeting of the National Fertilizer Association will be held on November 14, 15 and 16 at the Atlanta-Biltmore Hotel, Atlanta, Ga. The program which is being prepared will emphasize the current problems of the American farmer. Those planning to attend are asked to make their reservations directly with the hotel management.

## Fertilizer Control Officials to Meet

The annual meeting of the Association of American Fertilizer Control Officials will be held in Washington, D.C., on Friday, October 7th. An interesting program has been arranged, details of which can be obtained from the secretary, Henry Walls, College Park, Md. An invitation has been extended by B. D. Cloaninger, president of the association, to all members of the fertilizer industry to attend this meeting.

## U.S.D.A.

### Opens Superphosphate Bids

Bids for the purchase of 10,000 tons of superphosphate by the U. S. Department of Agriculture for distribution in Iowa, Kentucky, Tennessee and Michigan under the agricultural conservation program were opened on August 30th. Prices were quoted by 21 fertilizer companies, the 20 per cent grade being offered in most cases, with a few quoting on the 18 and 19 per cent grades. The prices per unit of A.P.A. ranged from 79 to 92 cents in Georgia, 82 to 87 cents in Florida, 82 to 90 cents in South Carolina, 94 cents to \$1.02 in Maryland, \$1.15 to \$1.44 in the Middle West territory.

## Israel to Build Fertilizer Mixing Plant

Plans for the construction of a fertilizer mixing plant to cost about \$3,000,000 for buildings and equipment, in the new state of Israel are included in the expansion program of Fertilizers & Chemicals, Ltd. This is reported by Robert Szold, chairman of the board of the Palestine Economic Corporation, an American development Company which is a leading advisor and investor in Fertilizers & Chemicals, Ltd. This would permit the production of the specific fertilizer grades needed for Palestine agriculture and would reduce its imports of fertilizers to a considerable extent.

## International Reports Record Sales and Earnings

International Minerals & Chemical Corporation experienced the highest sales and earnings in its history during the 12-month period ended June 30, 1949, President Louis Ware revealed in the recent corporation annual report sent to stockholders.

Net earnings for the period were \$5,421,017 compared with \$5,016,028 for the corresponding 12 months ended June 30, 1948, representing \$6.36 per common share on the 790,305 shares outstanding as compared with \$5.85 per common share for the corresponding previous 12-month period.

Net sales for the year ended June 30, 1949, amounted to \$53,394,760 compared with \$50,123,269 for the previous corresponding 12-month period. Net working capital also showed an increase to \$15,433,318 on June 30, 1949, compared with \$13,244,705 on June 30, 1948.

"There is continued strong demand for the minerals, chemicals, and fertilizers produced by the corporation," Mr. Ware stated. "Based on this current demand and sales contracts already effected, it is reasonable to expect a satisfactory rate of operation and profit during the year ahead."

"The corporation has enjoyed excellent labor relations for over 20 years and it was only during the past year that the first serious interruption, due to a major strike, occurred. The 7-week work stoppage of the Florida phosphate plant during May and June caused losses to the corporation amounting to approximately 50 cents per common share. The employees lost approximately \$400,000 in wages and the railroads and various community services lost heavily. The principal causes of this strike were the demands by the union to dictate operating procedures that rightly are the prerogative of management and

for a higher wage scale than that in effect at neighboring competitors' plants. Such demands were not and could not be granted.

"Notwithstanding the stoppage of all operations at the Florida phosphate division, earnings were satisfactory by reason of increased shipments of high grade phosphates. Tonnage shipped in March and April was highest and next highest, respectively, of any months of the corporation's history.

"Completion during the year of the new drying, storage, and shipping facilities at the Noralyn mine near Bartow, Florida, gave much greater capacity and flexibility in shipment of the large Noralyn output. These additions also reduced the costs of handling, shipping, and drying.

"Foreign shipments of phosphate were below that which reasonably would be expected if free competition had existed. The administration of European aid favored French North African producers of phosphates and restricted exports of the Florida product to a degree not before experienced in peace years.

"Since the summer of 1948, indications have been that the world supply of phosphates as to tonnage alone is sufficient for current demand. Transportation and labor costs continued upwards and with that trend came greater preference for the higher grade material such as that produced at the Noralyn mine. This has become increasingly noticeable and it is believed the need for the high grade phosphates remains unfilled."

Mr. Ware reported that the plant food division again exceeded all previous sales records, with greatest increases experienced in the Middle West, midsouth, and southwest.

"Demand for nitrogen and potash again exceeded supply," he said, "until into the last quarter of the year when the nitrogen supply for the first time in several years appeared to

(Continued on page 24)

## FERTILIZER MATERIALS

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## FERTILIZER MATERIALS MARKET

### NEW YORK

**No Price Changes Reported in Chemical Fertilizer Materials. Contract Shipments Proceeding on Schedule and Demand Adequate to Absorb Any Extra Production. Some Interest Shown in Feeding Organic Materials. Little Change in Superphosphate and Potash Situation**

*Exclusive Correspondence to "The American Fertilizer"*

New York, September 14, 1949

#### Sulphate of Ammonia

No change in prices was reported and producers were shipping against yearly contracts. Some demand was reported for export to such places as the Philippines.

#### Nitrate of Soda

This market was a routine affair with continued arrivals at various ports of Chilean material and with domestic producers in good position to take care of orders for nearby shipment.

#### Ammonia Nitrate

Shipments continued against contracts and production at some points was said to be increasing. Buyers continued to take material as it became available.

#### Notrogenous Material

Some producers were sold out for the balance of this year and prices were firm. Most prices ranged from \$3.60 to \$4.00 per unit of ammonia (\$4.37 to \$4.86 per unit N), f.o.b. production points.

#### Castor Pomace

No additional material was offered. Producers reported light production and were sold ahead on contract. Several offerings of imported material were made at prices considerably above the domestic market.

#### Organics

Tankage and blood last sold at about \$10.00 per unit of ammonia (\$12.15 per unit), f.o.b. Eastern shipping points. The feed trade were doing some buying but most fertilizer buyers remained out of the market, hoping for lower prices. Soybean meal for quick shipment sold at \$84.00 per ton in bulk, f.o.b. Decatur, Ill., but material for future delivery was quoted cheaper. Some buyers feel that when the new crop material comes on, the market prices will

be lower. Linseed meal was not very active and buyers only bought for their immediate needs. Cottonseed meal also could be purchased for future at prices considerably under the spot market.

#### Fish Meal

Due to the poor weather, fishing was reported as off and the catch light. Fish factories are still delivering material on old contracts and trying to catch up with their deliveries. Spot fish meal sold at \$180.00 per ton and was rather difficult to locate and the demand from the feed trade remained good. Several parcels of imported material arrived at East Coast ports.

#### Bone Meal

Raw bone meal was very scarce and no offerings were reported. The small supply of steamed bone meal was quickly absorbed by eager buyers. Imported feeding bone meal continued to arrive at various ports but this material is considered too finely ground to use for fertilizer.

#### Hoof Meal

Sales were made on basis of \$7.50 (\$9.12 per unit N), f.o.b. Western production points with supplies limited. Demand continued good from the fertilizer trade.

#### Superphosphate

No price changes occurred and shipments were being made to regular contract customers. Bids were recently opened by a Government agency and were placed with various Eastern suppliers. No change was reported in triple superphosphate.

#### Potash

Shipments continued by domestic producers against contracts, with buyers showing a willingness to take material whenever available. The demand continued good from various sections.

## CHARLESTON

**Organics the Only Materials in Short Supply for Coming Season. Little Change in Price of Chemical Materials**

*Exclusive Correspondence to "The American Fertilizer"*

CHARLESTON, September 12, 1949

With the exception of organic sources of nitrogen, all fertilizer materials are expected to be sufficient in supply for the coming season, although potash may be a little short in certain sections.

**Organics.**—Interest in organics for fertilizer use has been sufficiently strong recently to cause an upward movement in price. Castor pomace continues tight in supply, and nitrogenous producers are heavily sold. Domestic nitrogenous tankage is quoted at \$3.15 to \$4.00 per unit of ammonia (\$3.83 to \$4.86 per unit N), in bulk depending on the producer. Imported nitrogenous tankage is offered at around \$4.80 per unit of ammonia (\$5.83 per unit N), c.i.f. Atlantic port in bags.

**Castor Pomace.**—The supply situation on castor pomace continues tight and the market is around \$24.00 per ton in bags, f.o.b. northeastern production points. Movement is primarily against previous contracts. Imported castor pomace is indicated at around \$32.00 to \$38.00, c.i.f. Atlantic ports during the fall.

**Dried Ground Blood.**—Recent sales at \$10.00 per unit of ammonia (\$12.15 per unit N), f.o.b. New York area have been reported. The Chicago market is around \$9.50 per unit of ammonia (\$11.55 per unit N).

**Potash.**—Movements against contracts are steady, with deliveries of domestic production ahead of last year at this time. No change in prices has been noted.

**Ground Cotton Bur Ash.**—This excellent source of carbonate of potash continues at around 75 cents per unit of K<sub>2</sub>O, in bulk carload lots, f.o.b. Texas shipping point.

**Phosphate Rock.**—Stocks continue adequate for domestic and export needs. Shipments to acidulators continue at a steady pace. No changes in prices have been noted recently.

**Superphosphate.**—Demand is seasonal and stocks adequate to meet the call. Prices remain steady.

**Sulphate of Ammonia.**—Domestic coke oven sulphate of ammonia continues at around \$45.00 per ton in bulk, f.o.b. the ovens, with the producers heavily sold. Synthetic production varies in price from \$45.00 to \$48.00, depending on the point of production.

**Ammonium Nitrate.**—Canadian production is priced at \$63.00 per ton, f.o.b. Canadian

shipping point, and one of the leading domestic producers has reduced his price \$1.00 per ton to a new basis of \$58.00 per ton in bags, f.o.b. shipping point. This price is retroactive to July 1st.

**Hoof Meal.**—This excellent organic source of nitrogen is offered at around \$7.50 per unit of ammonia (\$9.12 per unit N), in bags at Atlantic coast ports for fall arrival. The Chicago market is also at \$7.50 per unit of ammonia (\$9.12 per unit N).

**Nitrate of Soda.**—No change in the supply or price situation has been noted. Demand continues seasonal with stocks adequate.

## PHILADELPHIA

**Market Shows Seasonal Quiet. Most Materials in Adequate Supply. Contract Shipments Satisfactory**

*Exclusive Correspondence to "The American Fertilizer"*

PHILADELPHIA, September 12, 1949

The market in raw fertilizer materials is seasonally quiet with shipments confined mostly to standing contracts. Supplies seem to be quite ample to meet all requirements, with the possible exception of bone meal.

**Sulphate of Ammonia.**—This is moving regularly on contracts, with no price changes noted. Prices in Europe have been advanced, which tends to quicken export inquiry here.

**Nitrate of Soda.**—The market is quiet with extremely limited movement, and no changes in price.

**Blood, Tankage, Bone.**—Blood and tankage are considerably easier with offerings rather limited at \$9.50 to \$10.00 per unit of ammonia (\$11.55 to \$12.15 per unit N), and little buying interest shown. Bone continues scarce for prompt shipment and is quoted nominally at \$65.00 to \$70.00 per ton, depending on grade and quality.

**Castor Pomace.**—This continues in low production with shipments allocated against contracts.

**Fish Scrap.**—Recent bad weather reduced the supply and the market is somewhat stronger. 60 per cent Menhaden meal is quoted at \$180.00 per ton, with scrap at \$175.00 to \$180.00.

**Phosphate Rock.**—No unusual developments are reported. The demand is said to be satisfactory both at home and abroad, and supply is sufficient to meet requirements.

**Superphosphate.**—Market remains rather dull with ample stocks to meet the demand. Deliveries against contracts are expected to

**Wherever you find  
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# RAYMOND

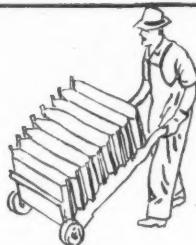
MULTI-WALL PAPER SHIPPING SACKS

These tough, strong, dependable fertilizer Shipping Sacks are first choice among producers, packers, and shippers of quality fertilizer—first choice because they are sift-proof, dust-proof, and water resistant.

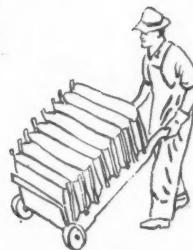
CUSTOM BUILT in various sizes, types, and strengths . . . printed or plain . . . made with valve or open mouth, sewn or pasted . . . RAYMOND MULTI-WALL PAPER SHIPPING SACKS are the answer to practically every packing and shipping problem of fertilizer. A Raymond representative will be glad to assist you in the selection of the ideal Shipping Sack for your requirements.

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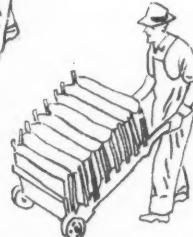
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**NEW  
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**Rotary Pulverizer**  
Grinds Tailings Without Clogging

- Completely grinds tailings
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This new Sturtevant Pulverizer increases the output of fertilizer tailings . . . cuts grinding costs. The rigid rotating bars smash tailings against the adjustable breaker plate assuring complete grinding of the pellets. It will not stop or clog.

The Sturtevant Rotary Pulverizer is superior to Hammer Mills, wherein the hammers stick, Cage Mills that will not grind small pellets, or knives that only slice or shear. Capacities of this pulverizer are as high as 35 tons per hour of tailings. Write for information, today.

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MECHANICAL DENS and EXCAVATORS • ELEVATORS • MIXERS

increase shortly. No price changes are recorded.

**Potash.**—Shipments on prior commitments continue, with the volume still ahead of last year. While quite some resale is being offered, no buying interest is being shown at any premium over contract figures. European offerings are receiving scant attention.

## CHICAGO

### Break in Organics Market with Sharp Drop in A Number of Prices. Future Trend Uncertain Exclusive

CHICAGO, September 12, 1949

The market on animal proteins in the Chicago area has had a bad break and producers are hoping that the shakeout has been or will soon be completed. There are some indications that prices have declined to a low enough basis to stimulate better demand, but it will take a few days to determine whether or not this buying interest will be sustained and prices will settle down.

Meat scraps in most locations have declined to \$100.00 per ton, which represents a further decline of approximately \$30.00, and digester tankage appears to be levelling off at \$125.00 per ton, which represents a further decline of \$25.00. There have been no reports of any sales below these prices.

Dry rendered tankage has been moving in a limited way at \$1.75 per unit of protein. Wet rendered tankage is down to \$8.50 per unit of ammonia (\$10.33 per unit N) but on further inquiries sellers are asking 50 cents to \$1.00 higher. Blood sold at \$9.50 per unit of ammonia (\$11.55 per unit N). Steamed bone meal, 65 per cent, is steady at \$75.00 per ton and raw bone meal at \$65.00

### New Law to Limit 1950 Cotton Acreage

Under the Pace Bill passed by the present Congress, the Secretary of Agriculture is given authority to reduce cotton acreage for the 1950 crop from the 1949 figure of 26,380,000 acres to 21,000,000 acres. Quotas will be assigned each cotton grower and the program must have the approval of two-thirds of the cotton planters in a referendum to be held this fall.

The 1949 acreage is 14 per cent greater than the 1948 plantings and is the largest acreage since 1937.

The purpose of the Pace Act is to balance cotton production with demand in order to maintain the price support program.



## Trona Muriate of Potash

Potash, one of the important ingredients of mixed fertilizer, is a vital soil nutrient which aids crop production and helps resist plant diseases. To provide the maximum of this important plant food, we are operating full capacity at Trona, 24 hours a day.

## Three Elephant Borax

Agricultural authorities have shown that a lack of Boron in the soil can result in deficiency diseases which seriously impair the yield and quality of crops. When Boron deficiencies are found, follow the recommendations of your local County Agent or State Experimental Stations.



## AMERICAN POTASH & CHEMICAL CORPORATION

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"Three Elephants" Muriate of Potash in America

## OBITUARY

### H. R. Bates

The fertilizer industry has lost another member of the "Old Guard" through the death on August 27th of H. R. Bates, former production manager of the plant food division of International Minerals & Chemical Corporation at Atlanta, Ga. He was 76 years of age.

Mr. Bates joined the company in 1912 and advanced to the position of southern production manager. When the offices of the corporation were moved to Chicago, he remained in Atlanta as general consultant for fertilizer operations, carrying on chemical and industrial research at the East Point laboratories. He retired in 1946 after 34 years of service.

### Chase Bag Official Scores Hole-In-One

Golfdom's Hole-In-One Club initiated a new member yesterday when C. S. Sheldon, Chase Bag Company vice president, chalked up an ace at Greenwich, Connecticut's, Round Hill Country Club. Equally phenomenal was

the score turned in by members of the Sheldon foursome as a group which established a record on the same 172 yard 6th hole when they posted individual scores of 1, 2, 3, and 4. Following Mr. Sheldon's hole in one, a birdie 2 was dropped by E. K. Ludington, Jr., a par 3 by W. J. Newhouse and a bogie 4 by Mrs. E. K. Richards.

The occasion was an annual outing of Chase Bag Company's New York branch of the Quarter Century Club which each year honors employees with ten or more years of service. As principal speaker at the evening banquet, Mr. Sheldon jovially commented that obviously golf was a very easy game. He neglected, however, to mention his total score.

### Farm Co-op Memberships Increase

A half million rise in farm memberships in marketing and purchasing cooperatives—from 5,400,000 to 5,900,000—was made in the 1947-48 marketing season over the previous year, according to estimates of the Farm Credit Administration, U.S. Department of Agriculture. These nearly 6 million memberships, however, represent some duplication, as many farmers are members of more than one

**V-C PRODUCTS**

**V-C PHOSPHATE ROCK PRODUCTS**  
Phosphate Rock, Ground and Unground  
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The Vicar® Line of Cleaners

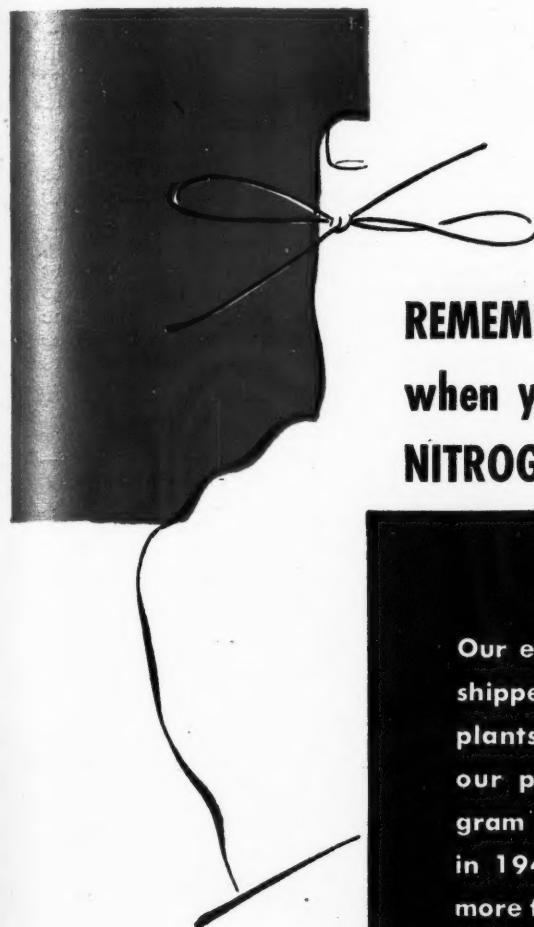
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General Offices:  
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**REMEMBER the name LION  
when you think of  
NITROGEN fertilizer products**

Our entire production is being shipped exclusively to fertilizer plants in the deep South, and our present expansion program scheduled for completion in 1949—should enable us to more fully meet your needs for:

- Nitrogen Solutions
- Sulphate of Ammonia
- Ammonium Nitrate Fertilizer
- Anhydrous Ammonia

Chemical Division  
LION OIL CO.  
El Dorado, Arkansas

Technical service  
available to  
fertilizer  
manufacturers



cooperative. The figure, therefore, exceeds the actual number of individual farmers who are members of these cooperatives.

Again Minnesota topped the other States in memberships with nearly 602,000 members. Illinois was close behind with 542,000 and Wisconsin third with 334,000.

For the first time in many years, the downward trend in number of cooperative associations has reversed itself. This latest report shows 10,160 marketing and purchasing associations, a slight increase over the 10,125 in the previous year.

Dollar volume for the 1947-48 season was a little over \$8.6 billion compared with \$7.1 billion for the 1946-47 year. This nearly billion and half dollar increase—about a 21 per cent rise—is accounted for in part by the higher prices farmers were receiving for their products and the increased prices paid by them for farm supplies in the 1947-48 season compared with the previous year. These prices rose 10 per cent and 13 per cent, respectively.

Of this total dollar volume, cooperative purchasing of farm supplies accounted for \$1.8 billion, while the balance of \$6.8 billion represented farm products marketed.

As in the previous year, grains accounted for the top dollar figure, amounting to about \$2.4 billion. Other commodities ranging near the top were dairy products with over \$1.9 billion, livestock with \$1.1 billion, fruits and vegetables with \$742 million, cotton with \$298 million, and poultry and eggs with \$275 million.

### September Cotton Report

A cotton crop of 14,943,000 bales is forecast by the Crop Reporting Board of the Bureau of Agricultural Economics. The indicated 1949 crop for the United States based on information as of September 1, is 138,000 bales, or 0.9 per cent, more than the August 1 forecast and 75,000 bales more than last year's

product. An increase in prospective production of 550,000 bales in Texas and 30,000 bales in Georgia more than offset declines in the Carolinas and Central Belt States. The production in 1948 was 14,868,000 bales and the 10-year average 11,306,000 bales.

The Bureau of the Census reports 1,247,443 bales ginned from the crop of 1949 prior to September 1st, compared with 1,444,355 bales for 1948 and 686,109 bales for 1947.

No estimate of cottonseed production will be made until final ginnings for the season are released. However, if the ratio of lint to cottonseed is the same as the average for the past five years, production would be 6,027,000 tons, compared with 5,941,000 tons in 1948 and the 10-year average of 4,631,000 tons.

| State                          | PRODUCTION (GINNINGS)<br>500-lb. gross wt. bales |                 |                                      |
|--------------------------------|--------------------------------------------------|-----------------|--------------------------------------|
|                                | Aver-<br>age<br>1938-<br>1947                    | 1948<br>Crop    | 1949<br>Crop<br>Indicated<br>Sept. 1 |
|                                | Thous.<br>bales                                  | Thous.<br>bales | Thous.<br>bales                      |
| Missouri . . . . .             | 356                                              | 506             | 475                                  |
|                                | 22                                               | 24              | 23                                   |
| N. Carolina . . . . .          | 549                                              | 678             | 540                                  |
| S. Carolina . . . . .          | 716                                              | 871             | 600                                  |
| Georgia . . . . .              | 779                                              | 745             | 600                                  |
| Florida . . . . .              | 14                                               | 15              | 18                                   |
| Tennessee . . . . .            | 523                                              | 670             | 625                                  |
| Alabama . . . . .              | 901                                              | 1,197           | 900                                  |
| Mississippi . . . . .          | 1,588                                            | 2,353           | 1,450                                |
| Arkansas . . . . .             | 1,329                                            | 1,982           | 1,600                                |
| Louisiana . . . . .            | 528                                              | 756             | 625                                  |
| Oklahoma . . . . .             | 521                                              | 374             | 410                                  |
| Texas . . . . .                | 2,722                                            | 3,150           | 5,000                                |
| New Mexico . . . . .           | 119                                              | 236             | 310                                  |
| Arizona . . . . .              | 174                                              | 328             | 450                                  |
| California . . . . .           | 447                                              | 968             | 1,300                                |
| Other States . . . . .         | 16                                               | 15              | 17                                   |
| <i>United States . . . . .</i> | <i>11,306</i>                                    | <i>14,868</i>   | <i>14,943</i>                        |

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*Woodward & Dickerson*  
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Paper Lined Bags  
to preserve the *Natural*  
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Fulton WPPL Bags are made from quality burlap or cotton material laminated with a waterproof adhesive to a special crinkled kraft paper lining. The result is a sift proof and moisture proof package that is much stronger than an unlined textile bag.

In addition to protecting your product from moisture, Fulton WPPL Bags offer you other important advantages over rigid containers. These include lower cost, ease of handling, less storage space, lower freight costs, and elimination of the burdensome record-keeping of returnable containers.

Fulton WPPL Bags are available in a variety of linings and adhesives for specific commodities. Write our nearest plant for samples and prices.



Your Style **MULTIWALL PAPER BAG** is made by Fulton — any size, all types — pasted or sewn bottom, open mouth or valve. Fulton makes the MULTIWALL to fit your product. Write for further information.

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564-5

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## Davison Chemical Reports Profitable Year's Business

In his annual statement to the stockholders of the Davison Chemical Corporation, Baltimore, Md., Chester F. Hockley, president and chairman of the board, reports sales for the year ending June 30, 1949, of \$37,350,073, the highest volume in the history of the company and \$3,800,000 above the previous 1947-48 record.

Net income after provision for Federal and State income taxes was \$2,275,884, equivalent to \$4.43 per share of capital stock outstanding. The above taxes amounted to over \$1,300,000.

Additions and replacements of property, plant and equipment during the year aggregated \$2,407,148. More than half of this amount was expended for new supplemental facilities to make increased and improved production available from existing plants. These facilities include a flotation plant for increased recovery of high grade phosphate rock, phosphate rock land purchased for current mining, additional facilities at the Perry, Iowa superphosphate and fertilizer plant, and additions to the catalyst and silica gel production facilities.

## Fisher Introduces New Laboratory Balance

A new analytical balance for use in weighing soil samples and chemicals which will give results to 1/20 of a milligram in one-third the usual time has been put on the market by Fisher Scientific Company, Pittsburgh, Pa.

This direct-reading instrument, called the "Gram-atic Balance," has only one pan, and the weight reads directly on a scale at eye level, eliminating a usual source of error in adding up individual weights. The balance has all required weights built-in and manipulated by turning four external knobs. No weights are handled, weights less than 0.1 gram are indicated optically and automatically. Total weight is read directly from a scale on the instrument panel. The sample to be weighed can range from 200 grams (approx. 7 oz.) to 0.0001 gram.

Because of its speed and simplicity of operation, the new balance is ideal for production control at test stations in testing laboratories. The sturdy construction and elimination of the adding-up of individual weights, greatly reduces training time for operators.

Full information on the possibilities of this apparatus in the fertilizer and soil analytical laboratory will be furnished by the Fisher Scientific Company on request.

## Wheat Needs More Fertilizer

In an article in the September 3rd issue of *American Agriculturist*, George Serviss recommends increased use of fertilizers on winter wheat in the northeastern section of the country.

"One of the best ways for the average farmer to increase yields is by more liberal fertilization. Studies in the western New York wheat belt indicate the average wheat grower in that area uses about 250 pounds to the acre. This could well be increased by 100 pounds with profit to most situations. The fertilizer applied at the time wheat is sown is usually expected also to take care of the hay or pasture seeding which often is broadcast on the wheat in the spring. Two hundred and fifty pounds per acre is not enough to do both jobs well."

"The grades recommended and used for wheat vary somewhat from state to state. In New York, 6-12-6 or 5-10-5 at about 350 pounds to the acre is the recommendation for average situations. On land where very little fertilizer has been used in recent years, a mixture proportionately higher in phosphoric acid, such as 6-18-6 or 4-12-4, will usually give better results."

In New Jersey, 4-12-8 is the regular recommendation at 300 to 500 pounds to the acre.

**HEAVY DUTY MULTI-WALL  
SHIPPING SACKS**

OPEN-MOUTH VALVE-TYPE  
PASTED AND SEWN  
Including Flat Tube Valve Bags

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**SPENSOL®**  
SPENCER NITROGEN SOLUTIONS

When you look to Spencer Chemical Company for your agricultural nitrogen, you assure yourself continuous supply and prompt service. Spencer's strategic location in the heart of the midwest farm country will help you step up the efficiency of your operation.

And, as users will testify, SPENSOL (Spencer Nitrogen Solutions) fills every need for high analysis nitrogen mixing compounds. It is the first sure step toward well-conditioned, economical fertilizers.

The Spencer Technical Service Department is always ready to advise you without cost or obligation.

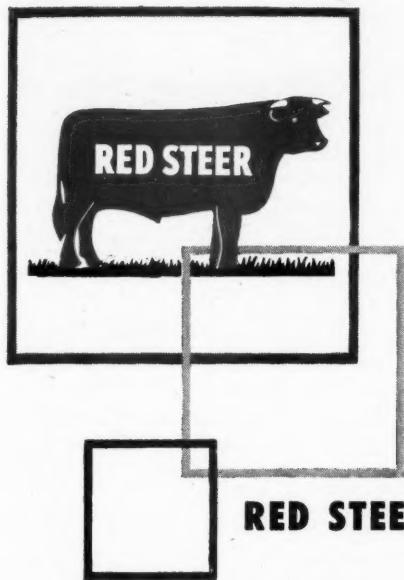
Representatives will gladly suggest ways in which you can make your plant more efficient and show you how to produce higher analysis fertilizers with SPENSOL.



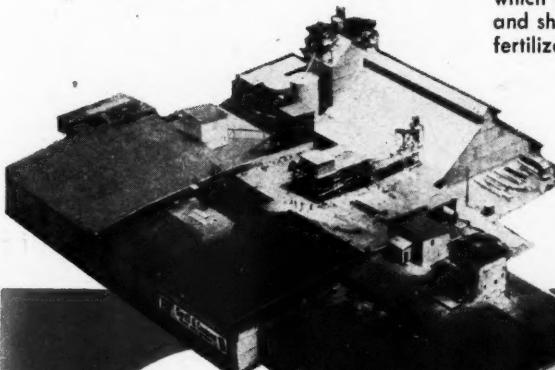
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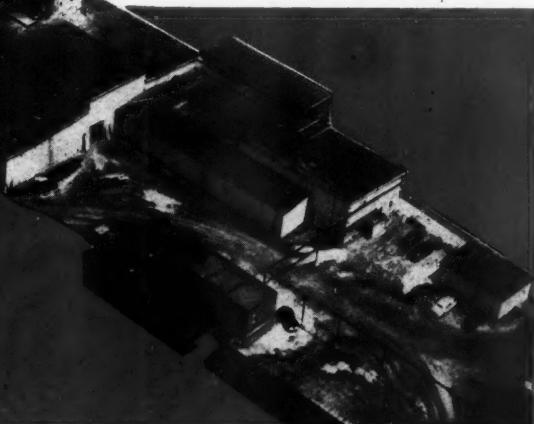
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## RED STEER'S CORRAL



This great East  
St. Louis plant of Swift  
& Company's Plant Food  
Division produces Red Steer  
Plant Food (as well as Vigoro,  
Blenn, and Brimm) for Iowa,  
Missouri, Kansas, Illinois,  
Kentucky, Tennessee,  
Oklahoma, and Ar-  
kansas.



In Pennsylvania 4-12-8 and 3-12-6 are recommended and widely used. In many instances, higher analysis grades conforming closely to some of the above ratios are available and are the best buys on a plant food basis.

"A practice that many will want to try, at least on part of their acreage next spring, is top-dressing with straight nitrogen or a high nitrogen mixed fertilizer, such as 10-10-10. Marked increases in yields have been obtained experimentally from this practice."

### Texas Fertilizer Sales Increase

Figures for the sales of fertilizers in Texas during the first six months of 1949, as compiled by J. F. Fudge, state chemist, show consumption of 300,785 tons. This tonnage for the six-months period exceeded total sales for any complete year prior to the year July 1, 1945-June 30, 1946. About two-thirds of this total were mixed fertilizers and one-third unmixed fertilizers (materials). Over 90 per cent of the mixed goods sold were of two grades—5-10-5 and 4-12-4. For the first time, sales of the 5-10-5 grade exceeded (by about one-third) those of 4-12-4. Two years ago, the tonnage of 4-12-4 was about twice that of 5-10-5.

Sales of materials were slightly higher than a year ago, but the materials accounting for nearly all of the tonnage remained about the same. These were ammonium phosphate-sulphate (16-20-0), ammonium nitrate and superphosphate. Sales of ammonium nitrate and superphosphate were about the same as a year ago. Slightly more nitrate of soda was available this year, but the increase in tonnage was more than compensated for by the decrease in sales of ammonium nitrate.

### INTERNATIONAL REPORT

(Continued from page 12)

equal demand. Indications are that there will be a sufficient supply of nitrogen during the forthcoming year."

### Classified Advertisement

**WANTED:** Fertilizer Plant. Purchase outright or purchase interest. Address "290" care THE AMERICAN FERTILIZER, Philadelphia 7, Pa.



Potash production also was higher during the past year with the mine and refinery at Carlsbad, New Mexico, continuing to operate at capacity. "An addition to the refinery for the manufacture of refined potassium chloride was completed during the year. This product is being sold to others for the manufacture of potassium chemicals such as potassium hydroxide, potassium carbonate, and potassium chloride. Our refined potassium chloride is the purest product on the market and the new plant is operating profitably. An improved quality of potassium sulphate is also available from this new chemical plant."

### ST. REGIS INTRODUCES UNIT LOAD

(Continued from page 9)

a 62 per cent decrease in damage to filled bags in transit by recommending proper carloading and handling techniques.

Services of the Carloading and Materials Handling section include recommendations on the best methods of loading cars with filled multiwall bags, depending on commodity packed and size and type of bags and proper use of lift trucks, conveyors, flattening devices, and other handling machines.



### with FUR-AG

#### The Sterilized Organic Conditioner

FUR-AG reduces bag-set, promotes drillability and provides bulk. It is sterilized—freed from plant diseases, insects, weed-seeds and is dark in color.

Here is an inexpensive organic conditioner that is produced and available, bulk or bag, in volume the year around. Proved in use by leading fertilizer manufacturers.

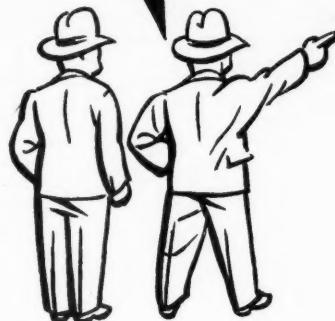
More complete information on request.

#### The Quaker Oats Company



CHEMICALS DEPARTMENT  
1885 Board of Trade Bldg.  
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**"There's the way to  
make money handling  
commercial fertilizers!"**



## **Bulk Handling . . . Bulk Delivery . . . No Bagging Baughman Equipment Cuts Costs & Increases Profit**

The bulk storage plant is the most efficient way known to handle commercial fertilizers! BAUGHMAN Belt & Bucket Elevator teamed with BAUGHMAN Screw Conveyors cuts man-hours to the minimum. Gives automatic material flow direct from car to storage bin or hopper bin . . . room storage bin to hopper bin for delivery.

**PROVEN LOW COST!** Belt & Bucket Elevator easily assembled from standard 10' sections, thus eliminating high cost of custom-built installations. Both elevator and conveyors economically produced by efficient assembly line methods for further savings. **RUGGEDLY BUILT** of high tensile alloy steel.

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### SULPHUR IN AGRICULTURE

(Continued from page 8)

terial reveal that acidification has increased the amounts or inorganic constituents present in the plant.

Chemical analyses made on the plant material reveal that acidification has increased the amounts of inorganic constituents present in the plant.

A discussion of soil acidification in relation to crop growth on alkaline soils is presented.

### Sulphur Fertilization in California and Some Related Factors

*John P. Conrad*

About 30 years ago in California fertilization of irrigated alfalfa with sulphur and carriers of sulphur (gypsum) was started. Tests in eleven or more of the 58 counties showed substantial increases in yield from sulphur fertilization even to more than doubling of the yields of alfalfa. In other areas no increases were secured.

More recently the deficiencies of soils for the growth of forage legumes in some of the dry-land pastures, ranges, and grain fields have been examined. Worthwhile responses in some areas have been secured from phosphates (treble superphosphate), but in other areas the very desirable range legume, bur clover, *Medicago hispida*, has increased substantially to markedly from sulphur applications. Other range and planted legumes may also be substantially increased by these applications. Other areas required both sulphur and phosphate for maximum production. The legume growth enhanced by sulphur fertilization has often augmented the growth of the following nonlegumes—i. e., range grasses and sown grain. Legume growth increased by phosphate fertilization may similarly enhance the following nonlegume growth. Sulphur as the element gave yields of bur clover about equal to sulphur from gypsum except when applied to the soil surface in areas or seasons with limited rainfall

which came only in the colder months. Under these conditions gypsum plots outyielded the sulphur as the element.

Removing a 10-ton crop of alfalfa—a high but not unusual annual yield—if it contains 0.25 per cent sulphur will remove 50 pounds of sulphur from an acre. The harvesting of other crops with lower percentages may remove sulphur ranging down to 4 or 5 pounds per acre per year. Thirteen representative California soils have been shown to contain 280 to 1400 pounds of sulphur per acre in top foot in depth. Rarely do soils contain substantial quantities of iron pyrites or other sulfides or, with the exception of semiarid soils, gypsum or other sulfates. The chief soil source of sulphur in most soils is the soil organic matter. The rate of supply of sulphur to the plant from this source is dependent among other factors upon the amount and nature of the organic matter, the presence of suitable organisms, and moisture, temperature, etc., favorable for the work of these organisms. Such catabolic activity usually results in sulfates. These sulfates are but weakly retained, if at all, by the soil. Under other circumstances, as in the presence of easily decomposable organic matter, such as cereal straws, soil microorganisms may compete with higher plants for the small amount of sulfate available on sulphur-deficient soils.

Soil type or soil series may often be used as a basis for correlating soil deficiencies with respect to phosphorus, potassium, or other elements. Less assurance can be placed on soil type or series with respect to sulphur deficiencies. Man's activities tend to upset such correlations:

The rainfall in rural areas far from industry may contain only a few pounds of sulphur per acre per year, but where industrial smokes are prevalent these amounts are much increased even to 100 pounds or more per acre per year.

Some important irrigation waters may add less than a pound while others may add over 1000 pounds of sulphur per acre per year.


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Fertilizer such as normal superphosphate, ammonium sulfate, and potassium sulfate may contain from 8 or 9 to over 20 or more per cent of sulphur.

Substantial amounts of sulphur may be added to the soil in various insecticides and fungicides.

### Sulphur in the American Fertilizer Industry

*Vincent Sauchelli, Davison Chemical Corp.*

Sulphur-containing fertilizers have been used increasingly in agriculture for more than a century. Agriculture is the largest consumer of sulphur in the form of plant nutrient, as fungicide and particularly as a raw material in the manufacture of superphosphate and sulphate of ammonia. Equal weights of rock phosphate and of 50% Be. sulphuric acid are required to produce superphosphate, of which more than 10,000,000 tons 18 per cent basis were produced in 1948. Fertilizer manufacture consumes about one-third of the country's total production of acid.

Brimstone at present is the chief source of sulphuric acid manufacture in the United States with pyrites a low second. In 1948 about 8,250,000 tons of 100 per cent acid were made from brimstone and 1,250,000 tons from pyrites. Sulphuric acid is produced by two processes: the chamber and the contact process. Chamber acid until recently was the principal source of acid for acidulating rock phosphate. The two world wars stimulated the production of contact acid.

About 94 out of a total of 191 superphosphate plants have co-existing sulfuric acid plants. Acid being a relatively low-priced commodity used in producing superphosphate, also a low-priced commodity, makes it necessary to reduce transportation costs to a minimum; hence these coexisting acid plants at fertilizer producing points.

Superphosphate is a generous contributor of sulphur nutrient to agriculture in the form of calcium sulphate which comprises about half the weight of superphosphate. About 11.5 per cent of the superphosphate is sulphur.

### Sulphur in Fertilizers, Soil Amendments, and Manures

*A. L. Mehring and Gae A. Bennett, Division of Fertilizer and Agricultural Lime, Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Maryland*

The mean SO<sub>3</sub> content of various fertilizers was determined from large numbers of

analyses to be as follows: 11-48 ammonium phosphate 5.59, 16-20 ammonium phosphate-sulfate 38.49, ammonium sulfate 59.67, wet-mixed base goods 23.63, calcined kieserite 64.71, calcium cyanamide 0.92, cotton seed meal 0.98, dolomite 0.65, double superphosphate 3.40, acid fish scrap 4.67, land plaster 43.87, 80 per cent manganese sulfate 51.95, potassium chloride 0.89, potassium sulfate 44.09, process tankage 2.26, sulfate of potash-magnesia 56.76, and superphosphate 29.09. Thus several important fertilizer materials contain little or no SO<sub>3</sub> than of nitrogen, P<sub>2</sub>O<sub>5</sub>, or K<sub>2</sub>O. Important materials that contain little or no SO<sub>3</sub> are ammonium nitrate, nitrogen solutions and sodium nitrate.

In 1947, fertilizers supplied 3,315,300, liming materials 115,000 animal manures 804,000, and insecticides and fungicides 377,000 tons of SO<sub>3</sub> to U. S. soils. In 1850 fertilizers accounted for 1000, gypsum 52,000, liming materials 2000, animal manures 282,000 tons, and miscellaneous materials 51,000 tons. Thus in a century the quantity of sulphur added to the soil in such materials increased nearly 9-fold. The quantities of sulphur added to soils as a result of smelting sulphide ores and burning coal have also greatly increased.

Free sulphur is added to many western mixed fertilizers to make them physiologically acid.

The percentage of SO<sub>3</sub> in mixed fertilizers as a general rule increases with both the nitrogen and P<sub>2</sub>O<sub>5</sub> contents to a total nitrogen, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O content of about 25 per cent. It decreases after that to zero at about 65 per cent total nitrogen, P<sub>2</sub>O<sub>5</sub>, and K<sub>2</sub>O.

The SO<sub>3</sub> content of the average mixed fertilizer used in 1947 is 19.35 per cent and that of the average mixed fertilizer for tobacco is 17.43 per cent, in spite of the fact that most of the potassium sulphate is used in making tobacco fertilizers.

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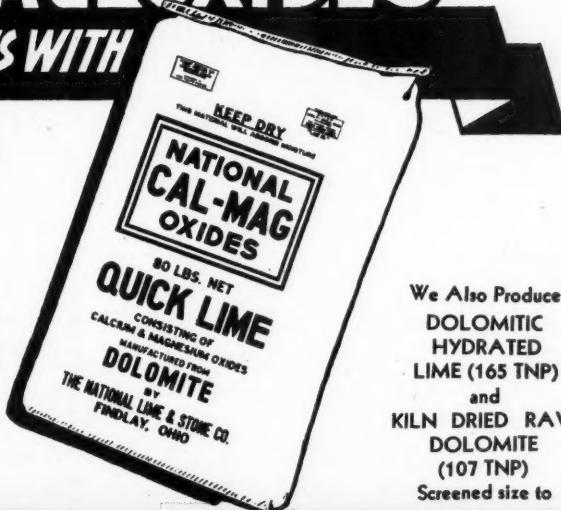
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 Huber & Company, New York City  
 International Minerals & Chemical Corporation, Chicago, Ill.  
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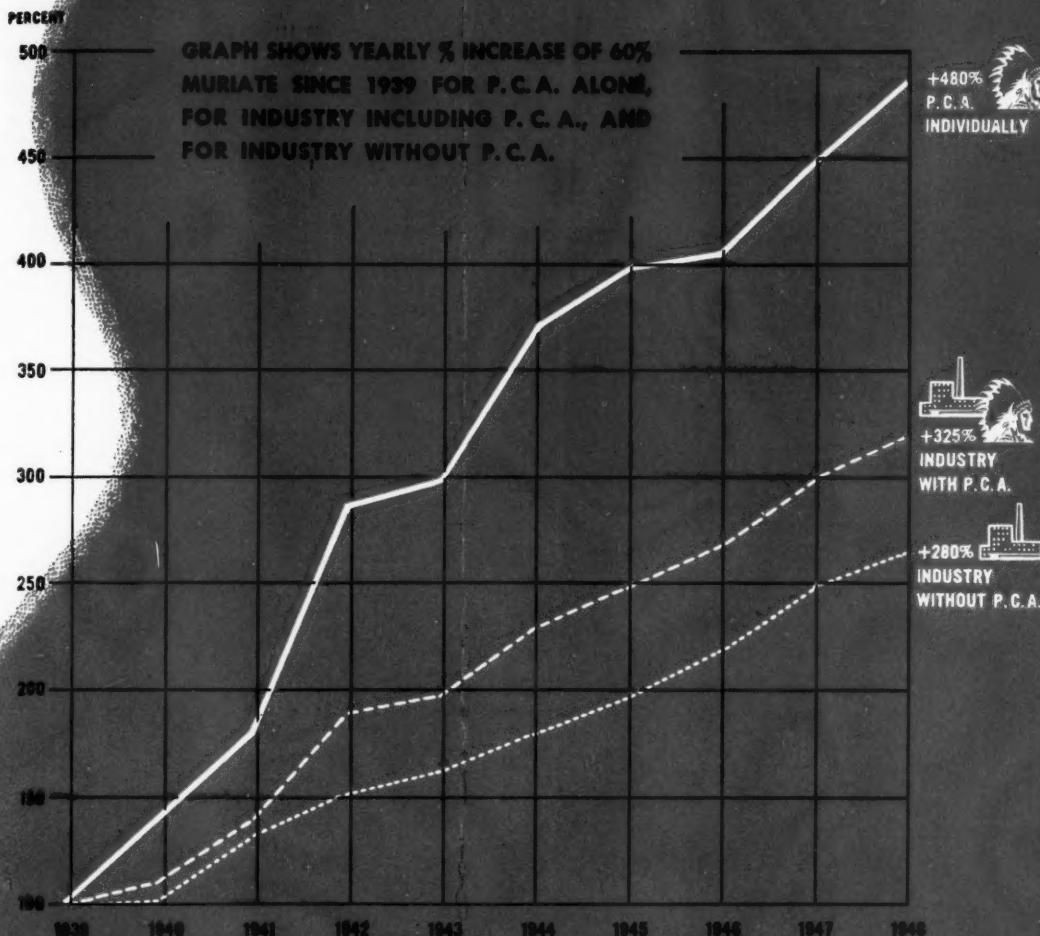
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